CLAIMS

What is claimed is:

1. A method for distributing air in a carbon monoxide cleanup system in a fuel reformer, the method comprising the steps of:

supplying air to a manifold;

supplying air from the manifold to each of two or more air inlet points in a carbon monoxide cleanup system;

proportioning the air supplied amongst the air inlet points by providing a fixed dimension flow path from the manifold to each air inlet point; and,

varying the air supply to the manifold to correspond to a calculated level of carbon monoxide in a reformate.

2. The method of Claim 1 further comprising providing the air supply to the manifold with a pump and the pump characteristics are taken into account in varying the air supply to the manifold.

3. The method of Claim 1 wherein the calculation of air supply is based on a system map relating an air supply level to a current mode of operation of the fuel reforming system.

4. The method of Claim 1 wherein the air inlet points comprise at least two air inlets into one or more preferential oxidation apparatuses.

5. The method of Claim 4 wherein the number of preferential oxidation apparatuses is selected from the numbers two through six.

6. The method of Claim 1 wherein at least one of the air inlet points is supplying air to a fuel cell anode.

7. The method of Claim 1 wherein the air supplied to one or more of the air inlet points can be shut off by a controller.

8. A system for distributing air for carbon monoxide clean-up comprising:

a manifold,

a fixed dimension flow path that connects the manifold to at least two air inlet points in a two stage preferential oxidation reactor (PrOx);

a pump which provides air to the manifold;

a pump map that determines an amount of air required for carbon monoxide cleanup for a given flow of fuel into the reformer, wherein the pump map takes into account the increase in reformate flow and the increase of carbon

monoxide concentration, and wherein the pump map is determined empirically; and,

a reformer reactor connected to the PrOx, the reformer reactor for making a reformate, the reformate comprising carbon monoxide.

9. The system of Claim 8 wherein the manifold is configured such that a certain percentage of air is sent to a first air inlet in a first stage PrOx reactor, a certain percentage of air is sent to a second air inlet in a second stage PrOx reactor, and the remainder of air is sent to an exit of the PrOx reactor or to an anode air bleed.

10. The system of Claim 9 wherein the air supplied to one or more of the first stage of the PrOx reactor, the second stage of the PrOx reactor, and the exit of the PrOx reactor or to the anode air bleed can be shut off by a controller.

11. The system of Claim 9 further comprising:

three fixed size orifices in the manifold or the fixed dimension flow path, the orifices being sized to provide that about 70% of air flowing out of the manifold goes to the first stage PrOx reactor, about 20% goes to the second stage PrOx reactor, and about 10% goes to the PrOx exit or to the anode air bleed.

12. The system of Claim 11 wherein the orifice sizes are 0.035" for the first stage PrOx reactor, 0.016" for the second stage PrOx reactor, and 0.011" for the PrOx exit or the anode air bleed.

13. A system for distributing air flow for selective oxidation of a reformate comprising:

an air supply; and,

a reactor coupled to the air supply, the reactor having a first air inlet and a second air inlet, wherein the first air inlet and the second air inlet are sized to deliver air to the reactor in a fixed proportion.

14. The system of Claim 13 wherein the air flow to the first air inlet and the second air inlet is based on a calculation, the calculation being based on a system map relating to an air supply level corresponding to an amount of reformate in the reactor.

15. The system of Claim 13 wherein the air flow supplied to one or more of the first air inlet and the second air inlet can be shut off by a controller.

16. A method for distributing air flow for selective oxidation of a reformate, the method comprising the steps of:

supplying air to two or more air inlet points in a reactor;

dividing the air supply amongst the air inlet points by sizing the air inlet points such that air is delivered in a desired fixed proportion; and,

varying the air supply to correspond to a calculated level of carbon monoxide in a reformate.

17. A system for distributing air flow for selective oxidation of a reformate comprising:

an air supply; and,

a fixed dimension flow path connected to the air supply for proportionately distributing the supplied air to a first reformer air inlet and a second reformer air inlet, the fixed dimension flow path being configured such that there is a fixed ratio between the volume of air sent to the first reformer air inlet and the volume of air sent to the second reformer air inlet, wherein the fixed ratio remains the same when the air pressure of the supplied air is varied according to a calculation based on a system map.

18. The system of Claim 17 wherein the first reformer air inlet provides air to a first reactor housing, and the second reformer air inlet provides air to a second reactor housing.

19. The system of Claim 17 wherein the first reformer air inlet and the second reformer air inlet both provide air to a single reactor housing.

20. The system of Claim 17 wherein the first reformer air inlet provides air to a reactor housing, and the second reformer air inlet provides air to an anode air bleed.

21. A method for distributing air flow for selective oxidation of a reformate, the method comprising the steps of:

supplying air to a reformer; and,

proportioning the supplied between a first reformer air inlet and a second reformer air inlet with a fixed dimension flow path, the fixed dimension flow path being configured such that there is a fixed ratio between the volume of air sent to the first reformer air inlet and the volume of air sent to the second reformer air inlet, wherein the fixed ratio remains the same when the air pressure of the supplied air is varied according to a calculation based on a system map.